Physics 2 Summer Syllabus

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Textbook: **OpenStax College Physics**

This textbook can be obtained free online from openstax.org. The physics is algebra-based and the book is relatively straightforward and accessible to high school and middle school students. You may use any other book you like as well, so long as you find the relevant content sections.

Material Covered

This course covers rotational motion, energy, torque, linear and angular momentum, gravitation, and Kepler's laws.

Class Structure

Except for the first day, the first hour is spent reviewing the previous day's homework and quiz or exam. Over the next two hours we cover new material, with example problems solved by the students throughout. During the last 30 minutes there is a comprehensive quiz with an emphasis on that day's material. On Fridays, there is only one hour of new material followed by 30 minutes of a modern physics topic voted on by the class, then the students take an hour-long comprehensive exam.
Each class will include three breaks of ten minutes each.

Schedule

Week 1

M: **Uniform Circular Motion, Centripetal Acceleration and Force**
Review of Physics 1, lecture, in-class problems, quiz
HW: Ch. 6.1, 6.2, 6.3, Handout

T: **Reference Frames, Gravitation, Kepler's Laws**
Lecture, in-class problems, comprehensive quiz
HW: Ch. 6.4, 6.5, 6.6, Handout

W: **Work, Kinetic Energy, Potential Energy**
Lecture, in-class problems, comprehensive quiz
HW: Ch. 7.1, 7.2, 7.3, 7.4, Handout

Th: **Conservation of Energy, Power**
Lecture, in-class problems, comprehensive quiz
HW: Ch. 7.5, 7.6, 7.8, 7.9, Handout

F: **Linear Momentum, Impulse, Conservation of Momentum**
Lecture, in-class problems, review, an interesting physics topic, exam
HW: Ch. 8.1, 8.2, 8.3, Handout

Week 2

M: **Elastic and Inelastic Collisions**
Lecture, in-class problems, comprehensive quiz
HW: 8.4, 8.5, 8.6, 8.7, Handout

T: **Torque and Stability**
Lecture, in-class problems, comprehensive quiz
HW: 9.1, 9.2, 9.3, Handout

W: **More Torque and Problem-Solving Strategies**

Lecture, in-class problems, comprehensive quiz
HW: 9.4, 9.5, 9.6, Handout

Th: **Rotational Motion and Angular Momentum**
Lecture, in-class problems, comprehensive quiz
HW: 10.1, 10.2, 10.3, 10.4 Review Handout

F: **Review of Course Material, Modern Physics Topic**
Lecture, Review, an interesting physics topic, comprehensive final exam

- Do the reading and the homework. I will go over the material in class beforehand. Physics, like mathematics, is comprehensive. If you don't learn an important concept, you won't be able to learn the others that build on it.
- Do all examples in the reading. Try to work them out without looking at the answer. This is a good way to judge whether you truly understand the material.
- Do the homework and write down questions you want to ask about certain problems.
- Solve problems carefully. You might be tempted to skip steps or plug in numbers early to save time. Resist these urges. Solve the problem to the end before plugging in any numbers, that way you can find mistakes without having to solve the entire problem again from scratch.
- In this course, I will teach you how to solve all the problems using systematic methods. But, often physics problems can be solved in clever, faster ways. Physics III focuses on quick and clever solutions to problems, but you can start to look out for them now.